



# *Demand and Supply Analysis*

## **Demand**

### **Shifts of the Demand Curve**

## **Supply**

### **Shifts of the Supply Curves**

### **Demand and Supply Creates a Market**

### **Change in Equilibrium Price and Quantity**

### **Disequilibrium Price**

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## *Demand*

- ***Demand* indicates how much of a good consumers are both *willing* and *able* to buy at each possible price during a given time period, other things constant**
  - ❖ 操縱變因: 價格, 應變變因: 數量
  - ❖ 控制變因: other things constant
- **Emphasis on individual being both willing and able to buy is critical**

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## *What is “willing” and “able”*

- ⊕ 買BMW的汽車
  - ⊗ Willing but not able
- ⊕ 買博達的股票
  - ⊗ Able but not willing

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## *Demand, Wants, and Needs*

- ⊕ **Demands ≠ Wants**
  - ⊗ ignore the importance of ability to buy as expressed by a person's budget
  - ⊗ 想買BMW轎車,超出預算
- ⊕ **demand ≠ need**
  - ⊗ focuses on the willingness and again ignores the ability to purchase

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## *Law of Demand*

- Says that *quantity demanded varies inversely with price, other things constant* (需求的數量和價格成反向)
  - The higher the price, the smaller the quantity demanded
  - The lower the price, the larger the quantity demanded

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## *What explains the law of demand?*

- Why is more demanded when the price is lower and vice versa?
- The explanation begins with **unlimited wants confronting scarce resources** (資源有限, 慾望無窮)

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## *What explains the law of demand?*

- Some ways of satisfying your wants are appealing than others
- In a world without scarcity, everything would be free → choose the most attractive alternative
- However, scarcity is a reality → the degree of scarcity of one good relative to another helps determine each good's *relative price* (物以稀為貴)

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## *Substitution Effect*

- Recall that the definition of demand includes the “other things constant” assumption
  - “Other things” are the prices of other goods
- Ex:
  - price of pizza ↓ , other prices unchanged
    - pizza becomes relatively cheaper
    - consumers are more willing to purchase pizza
    - Substitute pizza for other goods

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## Substitution Effect

- ⊕ **Substitution Effect**
  - Price of a good falls,
    - Lower relative price makes consumers more willing to purchase more
  - Price of a good increases,
    - Higher relative price makes consumers less willing to purchase this good
- ⊕ *The change in the relative price – the price of one good compared to the prices of other goods – that causes the substitution effect*

	麵	飯
原始價格	10	20
價格	20	40
價格	15	20

← relative price change

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## Income Effect

- ⊕ **Money income:**
  - the number of dollars received per period of time
- ⊕ **Real income:**
  - person's income measured in terms of the goods and services it can buy → purchasing power
- ⊕ **Price of a good decreases, a person's real income increases → increased ability to buy a good → increase in quantity demanded**

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## What if Price of Goods Increase?

新聞:國人實質薪資負成長將導致購買力衰退

【朱漢崙／台北報導】物價飆漲，使得原本已經相當微乎其微的薪資成長率，實際上已出現負成長的情況。根據行政院主計處目前的最新統計，截至今年五月底止，每人經常性薪資成長率僅有百分之零點八九，若扣除約百分之一點七四的物價上漲率，則實質薪資水準不增反減，已轉為負成長。

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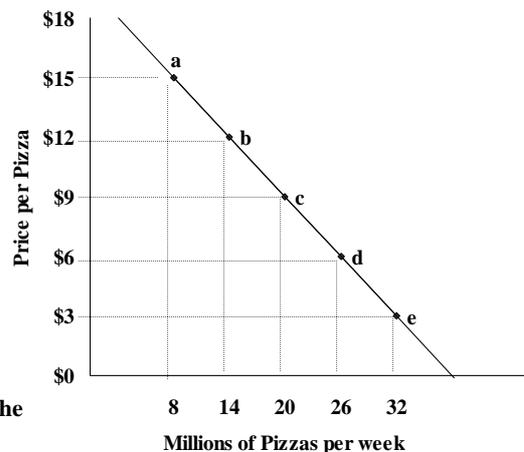
## Demand Schedule & Demand Curve for Pizza

Specify units being measured and the period considered.  
The price is for a 12 inch regular pizza and the time period is 1 week.

(a) Demand Schedule	
Price per Pizza	Quantity Demanded per Week (millions)
a) \$15	8
b) 12	14
c) 9	20
d) 6	26
e) 3	32

Consumers require more to buy at lower prices than at higher prices → the demand curve slopes downward.

(b) Demand Curve



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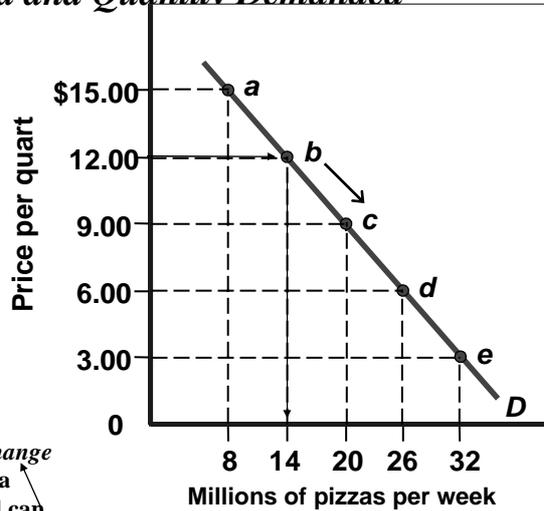
## Difference between Demand and Quantity Demanded

Demand denotes the relation between price and quantity demanded. It is represented by the demand curve

An individual point on the demand curve shows the quantity demanded at a particular price

The movement from say, *b* to *c*, is a change in quantity demanded and is shown as a movement along the demand curve and can only be caused by a change in price

NOT change in demand



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## Individual Demand Market Demand

- **Individual demand** refers to the demand of an individual consumer
- **Market demand** is the sum of the individual demands of all consumers in the market

Price	A demand	B Demand	Market Demand
5	3	6	9
10	2	5	7
15	1	4	5

- **Unless otherwise noted, we will be referring to market demand**

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# Demand and Supply Analysis

## Demand

Shifts of the Demand Curve → Change in demand

## Supply

Shifts of the Supply Curves

Demand and Supply Creates a Market

Change in Equilibrium Price and Quantity

Disequilibrium Price

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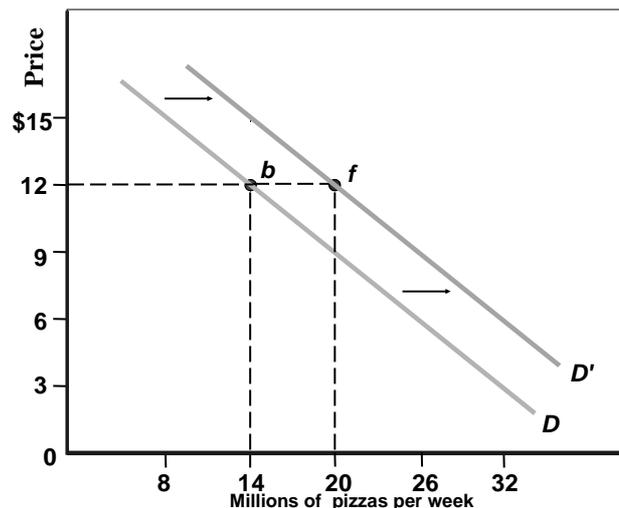
## Increase in the Market Demand

The original demand curve: D

Suppose income now increases  
→ Some consumers will now be able to buy more pizza at each price

→ At a price of \$12, the demand amount of increases from 14 to 20 million per week as shown by the movement from *b* on demand curve D to point *f* on demand curve D'.

→ rightward shift from D to D'



While not shown, a decrease in demand → leftward shift in the demand curve → means consumers are willing and able to buy less at each price.

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## *What Factors Change the Demand*

- ⊕ Money income of consumers
- ⊕ Prices of related goods
- ⊕ Consumer expectations
- ⊕ Number and composition of consumers in the market
- ⊕ Consumer tastes
- ⊕ The above factors are assumed not to be changed on a demand curve.

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## *Changes in Consumer Income*

- Goods can be classified into two broad categories: 根據需求和收入變動的關係
  - ▣ **Normal goods (正常財):** 需求隨收入增加(減少)而增加(減少)
  - ▣ **Inferior goods (劣等財, Giffen goods):** 需求隨收入增加(減少)而增加(減少)
    - As income increases, consumers tend to switch from consuming these goods to consuming normal goods
    - Ex: 地瓜, 泡麵

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## *Changes in the Prices of Related Goods*

- **Two general relationships**
  - Two goods are *substitutes*(替代) if increase in the price of one shifts the demand for the other rightward and vice versa.
    - Ex: 米和麵
  - Two goods are *complements*(互補) if increase in the price of one shifts the demand for the other leftward and vice versa
    - Ex: DVD燒錄器和燒錄片

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## *Changes in Consumer Expectations*

- A change in consumer expectations with respect to future prices and future incomes also shifts demand
  
- If individuals expect income to increase in the future, current demand increases and vice versa
  
- If individuals expect prices to increase in the future, current demand increases and decreases if future prices are expected to decrease

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## 新聞:強颱風逼近／市場公休加上颱風 菜價貴死人

- 隨著颱風腳步愈來愈近，菜價漲幅也愈來愈誇張，原本一公斤青蔥要價200元，才差了一天，菜市場標價已經漲到280元，漲幅高達4成，另外，由於天氣熱加上颱風來臨前的需求，雞蛋價格也同步飆漲，漲幅超過3成。

菜市場週一公休，加上強颱風直撲台灣，將挾帶強風豪雨，民眾預期心理又起，忙著搶購蔬菜，菜價也隨著直線上揚。

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## *Number or Composition of Consumers*

- **The market demand curve is the sum of the individual demand curves, a change in the number of consumers changes demand**
  - A increase in the number of consumers increases the market demand and vice versa.
- **A Change the composition of the consumers changes the demand**
  - 人口結構改變(高齡化)
    - 國教人力需求減少
    - 照護產業需求上升

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## *Changes in Consumer Tastes*

- Tastes are nothing more than a person's likes and dislikes as a consumer
- Difficult to say what determines tastes but clearly they are important
- And whatever factors change taste will clearly change demand

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## *Reminder*

- Important to remember the distinction between a movement along a given demand curve and a shift of the demand curve
  - A change in price, other things constant, causes a *movement along a demand curve* → changing quantity demanded
  - A change in one of the determinants of demand other than price causes a *shift of a demand curve* → changing demand

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## *Demand and Supply Analysis*

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## *Supply*

• ***Supply*** indicates how much of a good producers are willing and able to offer for sale per period at each possible price, other things constant

• ***Law of supply*** states that the quantity supplied is related to its price, other things constant

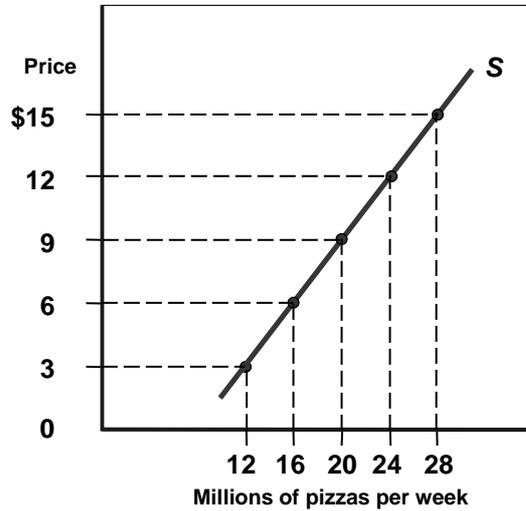
• The lower the price, the smaller the quantity supplied and vice versa

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### Exhibit 3: Supply Schedule and Curve for Pizzas

Supply Schedule	
Price per Pizza	Quantity Supplied per Week (millions)
\$15	28
12	24
9	20
6	16
3	12



Specify units being measured and the period considered.  
The price is for a 12 inch regular pizza and the time period is 1 week.

Producers offer more for sale at higher prices than at lower prices → the supply curve slopes upward.

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### Law of Supply

- Two reasons producers tend to offer more for sale when the price rises
- First, as the price increases, other things constant, a producer becomes more *willing* to supply the good
  - ❖ Prices act as signals about the rewards for producing various goods → higher prices attract resources from lower-valued uses
  - ❖ 考慮101大樓的商店

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## *Law of Supply*

- **Second, higher prices also increase the producer's *ability* to supply the good**
  - The law of increasing opportunity costs → the marginal cost of production increases as output increases (邊際成本隨產量上升提高)
  - Since producers face a higher marginal cost of production, they must receive a higher price for that output in order to be able to increase the quantity supplied
  - 廠商需在售價 > 成本下才願意生產

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## *Supply and Quantity Supplied*

- ***Supply* refers to the relation between the price and quantity supplied as reflected by the supply schedule or the supply curve**
- ***Quantity supplied* refers to a particular amount offered for sale at a particular price → particular point on a given supply curve**

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## *Individual Supply and Market Supply*

- ***Individual supply*** refers to the supply of an individual producer
- ***Market supply*** is the sum of individual supplies of all producers in the market

Price	A Supply	B Supply	Market Supply
5	1	4	5
10	2	5	7
15	3	6	9

- **Unless otherwise noted, we will be referring to market supply**

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## *What Factors Change Supply*

- ❖ State of technology
- ❖ Prices of relevant resources
- ❖ Prices of alternative goods
- ❖ Producer expectations
- ❖ Number of producers in the market
- The above factors are assumed not to be changed along a supply curve

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## *Changes in Technology*

- If a more efficient technology is discovered, production costs fall → suppliers will be more willing and more able to supply the good → rightward shift of the supply curve
- See next slide

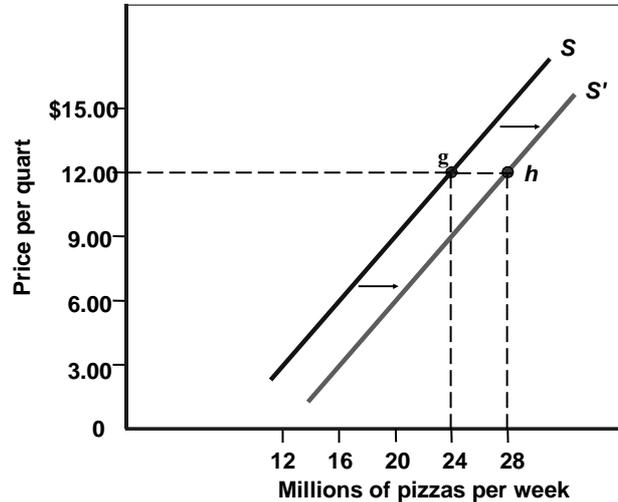
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## An Increase in the Supply of Pizza

Initial supply curve: S.  
A new high-tech:  
oven bakes pizza in half  
the time  
→ Supply curve shifts  
from S to S'.

E.g., when the price is \$12,  
the amount supplied  
increases from 24 million  
to 28 million pizzas, as  
shown by the movement  
from point g to point h.



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## Changes in the Prices of Relevant Resources

- ⊕ **Relevant resources** are those employed in the production of the good
- ⊕ For example,
  - the price of mozzarella cheese falls,
  - the cost of pizza production declines
  - supply increases → shifts to the right
- ⊕ Conversely, if the price of some relevant resource increases → supply decreases → shifts to the left

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## *Prices of Alternative Goods*

- Nearly all resources have alternative uses
- Alternative goods are those that use some of the same resources employed to produce the good
- For example, as the price of bread increases, so does the opportunity cost of producing pizza → the supply of pizza declines
  - 麵包和披薩都用到麵粉
- Conversely, a fall in the price of an alternative good makes pizza production more profitable → supply increases

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## *Changes in Producer Expectations*

- Changes in producer expectations with respect to the future can change current supply (製造商對未來的展望)
- If pizza suppliers expect higher prices in the future, they may begin to expand today → 供給增加
- When a good can be easily stored, expecting future prices to be higher may reduce current supply (囤積居奇)

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## *Changes in the Number of Producers*

- Since market supply sums the amounts supplied at each price by all producers, the market supply depends on the number of producers in the market
- If that number increases, supply increases → shifts to the right
- If the number of producers decreases, supply will decrease → shift to the left

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## *Reminder*

- The distinction between a movement along a supply curve and a shift of a supply curve
- *A change in price, other things constant, causes a movement along a supply curve, changing the quantity supplied*
- *A change in one of the determinants of supply other than the price causes a shift of the supply curve → changing supply*

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## *Demand and Supply Create a Market*

- **Demanders and suppliers have different views of price**
  - Demanders pay the price
  - Suppliers receive it
  
- **Higher price**
  - bad news for consumers
  - good news for producers
  
- **As the price rises,**
  - consumers reduce quantity demanded along the demand curve
  - producers increase their quantity supplied along the supply curve

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## Markets

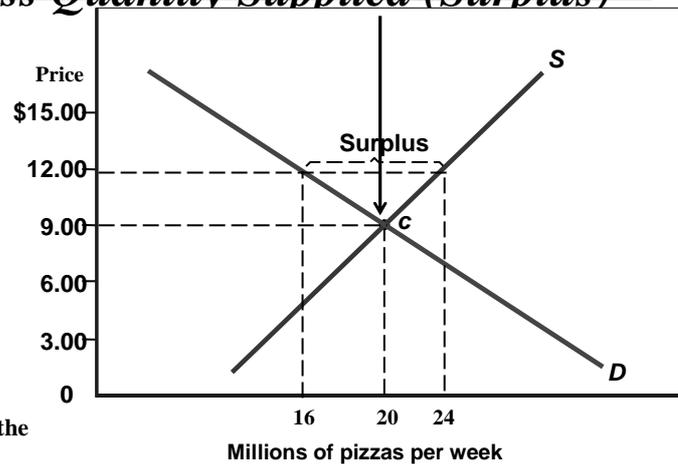
- A market sorts out the conflicting price perspectives among participants – buyers and sellers
- *Market* represents all the arrangements used to buy and sell a particular good or service
  - Reduce the *transaction costs* of exchange – the costs of time and information required for exchange
- The coordination
  - not because of central plan
  - but because of Adam Smith's *invisible hand*

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## Market Equilibrium Excess Quantity Supplied (Surplus)

Suppose the initial price is \$12  
 → producers supply 24 million pizzas per week  
 → consumers demand only 14 million  
 → *excess quantity supplied (or surplus)*



Supplier try to eliminate the surplus by putting downward pressure on the price(降價求售)

As the price falls, producers reduce their quantity supplied and consumers increase their quantity demanded and the market moves towards equilibrium *c*

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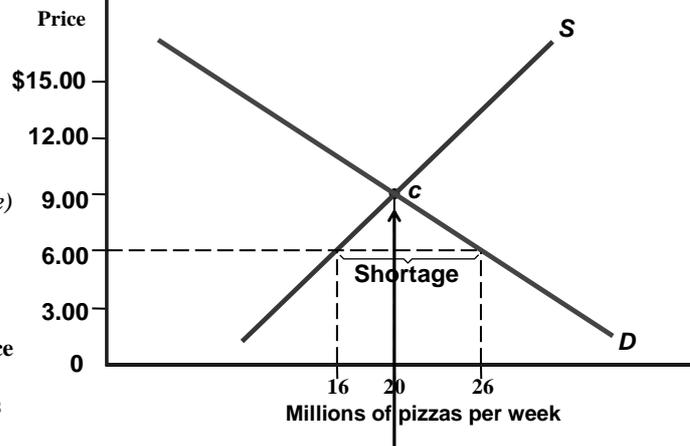


## Market Equilibrium

### Excess Quantity Demanded (Shortage)

Suppose the price is \$6  
→ Consumers demand  
26 million pizzas  
Producers supply only  
16 million  
→ *Excess quantity  
demanded (or a shortage)*

Producers quickly notice  
that the customers  
demanding more pizzas  
than they produce →  
pressures for higher prices



As prices increase, producers increase their quantity supplied and consumers reduce their quantity demanded until the equilibrium price of \$9 at point *c* is reached

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## Summary

- A *surplus* creates downward pressure on the price and a *shortage* creates upward pressure
- So long as quantity supplied and quantity demanded changes, prices will tend to change
- Note that *a shortage or a surplus must always be defined at a particular price*

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## *Equilibrium*

- **When the following are equal**
  - Quantity & price that consumers are willing and able to pay
  - Quantity & price that producers are willing and able to sell,
- **Market reaches equilibrium → the independent plans of both buyers and sellers exactly match**
- **Market forces exert no pressure to change price or quantity**
  
- **In previous example, equilibrium point c → price = \$9 per pizza and quantity is 20 million pizzas per week**

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## *Equilibrium*

- **Market is personal because each consumer and each producer makes a personal decision regarding how much to buy or sell at a given price**
- **In another sense, the market is impersonal because it requires no conscious coordination among consumers or producers**
- **Market forces synchronize the personal and independent decisions of many individual buyers and sellers**

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## *Changes in Equilibrium*

- Once a market reaches equilibrium, the price and quantity will prevail until one of the determinants of demand or supply changes
  
- A change in any one of these determinants
  - ❖ → Change demand & supply
  - ❖ → Change equilibrium price and quantity in a predictable way
  - ❖ See an example in next slide

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## 新聞: 供給減少造成油價攀升

- 美國卡翠娜颶風重創墨西哥灣煉油廠設施，造成油價飆漲，估計損失高達1000億美元，帶動油價周中挺升逼近每桶70美元，引發全球經濟成長減緩與通膨加溫的雙重擔憂。

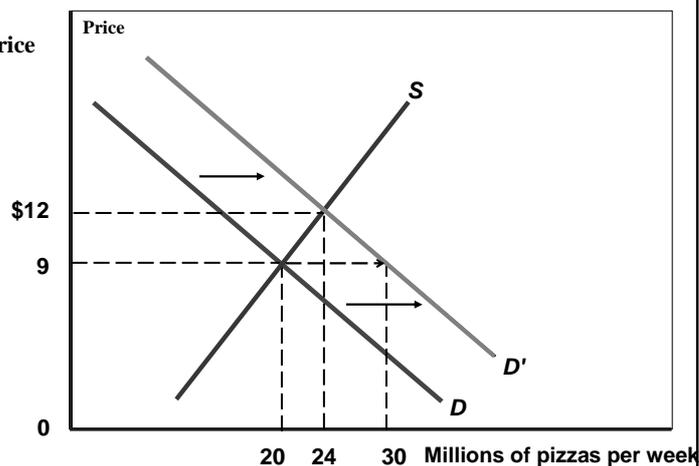
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## Effects of an Increase in Demand

The initial equilibrium price is given by D and S

Suppose demand increases → demand shifts from D to D'.

The amount demanded at \$9 is 30 million pizzas → Exceeds supplied amount (20 million) shortage → upward pressure on price.



As the price increases,  
the quantity demanded decreases along D',  
the quantity supplied increases along S  
Equilibrium point : Price \$12 and a quantity of 24 million pizzas

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## Shifts of the Demand Curve

- Thus, given an downward-sloping demand curve, an increase in demand (D to D') → a rightward shift of the demand curve increases both the equilibrium price and quantity
- Alternatively, a decrease in demand (D' to D) → a leftward shift of the demand curve reduces both the equilibrium price and quantity

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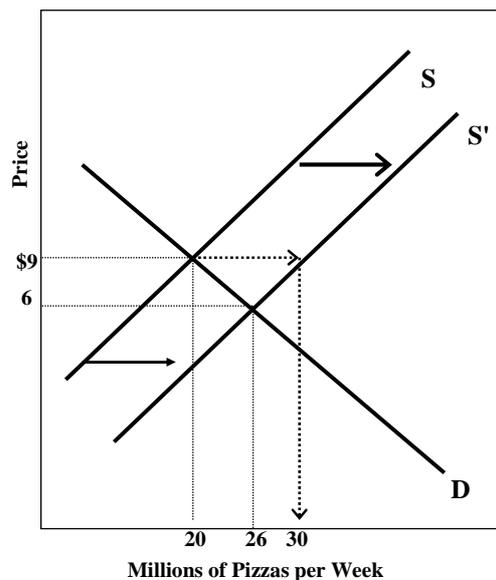


## Effects of an Increase in Supply

Begin with S and D  
→ Equilibrium price and quantities  
\$9.00 is 20 million pizzas.

Suppose supply increases  
→ shift from S to S'.

The amount supplied at price of \$9  
increases from 20 to 30 million  
→ surplus  
→ downward pressure on the price  
→ the quantity supplied declines  
along S'  
→ the quantity demanded increases  
along D  
→ New equilibrium: \$6 and 26  
million pizzas per week



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## *Shifts of the Supply Curve*

- An increase in supply (S to S') → a rightward shift of the supply curve reduces the equilibrium price but increases equilibrium quantity
- On the other hand, a decrease in supply (S' to S) → a leftward shift of the supply curve increases equilibrium price but decreases equilibrium quantity

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## *Simultaneous Shifts in Demand and Supply*

- As long as only one curve shifts, we can say for sure what will happen to equilibrium price and quantity
- If both curves shift, however, the outcome is less obvious
- See next slide

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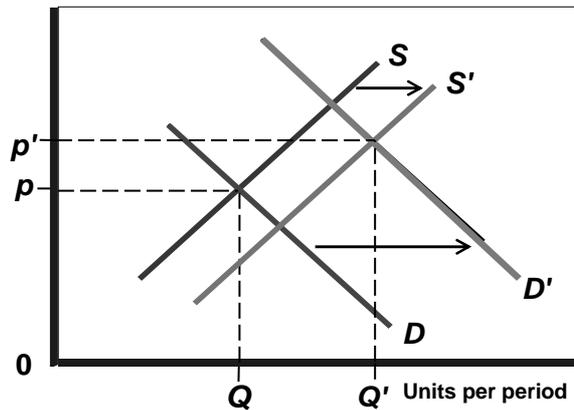


### Indeterminate Effect of an Increase in Both Supply and Demand Shift in demand dominates

Initial supply and demand:  $D, S$   
→  $p$  and  $Q$  are the equilibrium price and quantity.

Supply and demand both increase → shift to the right.  
Further suppose that demand shifts more than supply as shown by  $D'$  and  $S'$ .

In this instance, price and quantity both increase to  $p'$  and  $Q'$ .



If both demand and supply were to decrease – for example, from  $D', S'$  to  $D, S$  with the decline in demand dominating, both equilibrium quantity and price would decline.

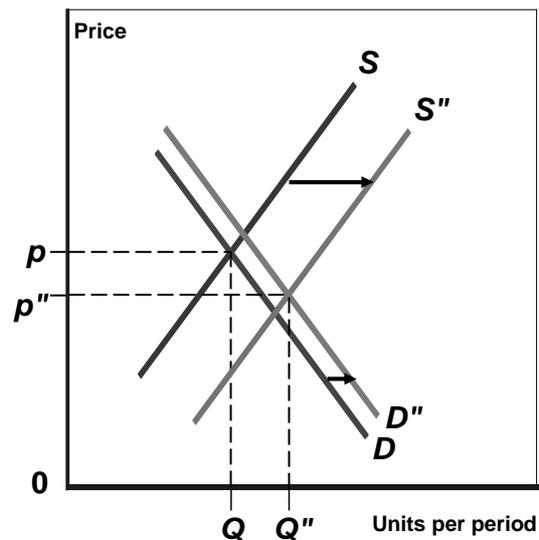
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### Indeterminate Effect of an Increase in Both Supply and Demand Shift in supply dominates

Supply shifts more than demand does → price decreases from  $p$  to  $p''$  and quantity increases.

Alternatively, if both supply and demand decrease with the shift in supply dominating → price will increase and quantity will decrease.



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## Summary

- If demand and supply shift in opposite directions, the equilibrium price
  - will increase if demand increases and supply decreases
  - will decrease if demand decreases and supply increases
- Without reference to the size of the shifts, we cannot say what will happen to equilibrium quantity

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## Effects of Changes in Both Supply and Demand

		Change in Demand	
		Demand increases P+, Q+	Demand decreases P-, Q-
Change in Supply	Supply increases P-, Q+	Equilibrium price change is indeterminate. Equilibrium quantity increases.	Equilibrium price falls. Equilibrium quantity change is indeterminate.
	Supply decreases P+, Q-	Equilibrium price rises. Equilibrium quantity change is indeterminate.	Equilibrium price change is indeterminate. Equilibrium quantity decreases.

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## *Disequilibrium Prices*

- Markets do not always reach equilibrium quickly and during the time required for adjustment, the market is in disequilibrium
- *Disequilibrium* is usually temporary as the market gropes (探索) for equilibrium
- Sometimes, as a result of government intervention in markets, disequilibrium can last a long time

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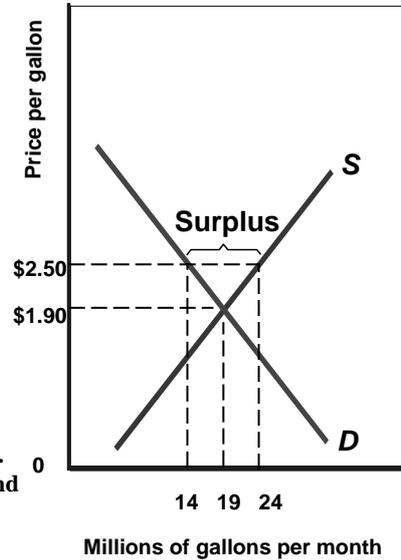
## Effects of a Price Floor(價格下限)

The federal government regulates the prices of agricultural commodities to ensure farmers a higher and more stable income

To achieve higher prices, the federal government sets a *price floor* → a *minimum selling price that is above the equilibrium price*

Suppose it places a \$2.50 per gallon price floor for milk. Farmers supply 24 million gallons per week, but consumers demand only 14 million → a surplus of 10 million gallons

This surplus milk will spoil if it sets on store shelves. The government spends billions of dollars buying and storing surplus agricultural products.



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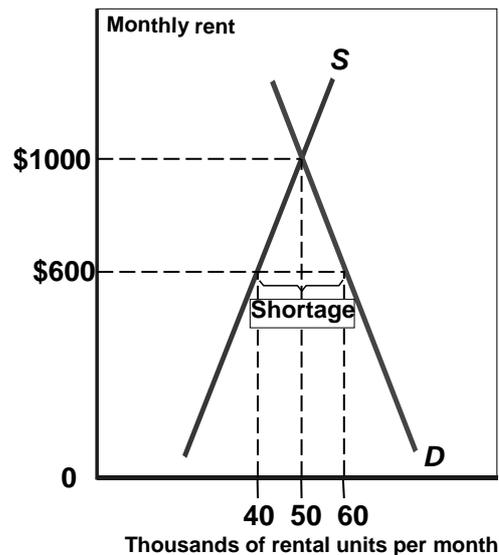


## Effects of a Price Ceiling(價格上限)

Government keeps prices below the equilibrium levels by establishing a *price ceiling*, or a *maximum selling price*

A common example is rent control in some cities. The market-clearing rent is \$1,000 per month with 50,000 apartments being rented.

Now the government decides to set a maximum rent of \$600. 60,000 rental units are demanded, but only 40,000 are supplied (a shortage).



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## 歷史實例:物價限制

- 背景:國共內戰崩潰前夕,惡性通貨膨脹
- 1948年8月19日,國民黨召開中央政治會議,通過由翁文灝、王雲五提出的貨幣改革方案。當晚即由蔣介石以總統名義發佈「財政經濟緊急令」,作出全國廣播,並公佈「金圓券發行法」,主要內容為:
  - 金圓券一元折法幣300萬元,東北流通券三十萬元
  - 禁止私人持有黃金、白銀、外匯。凡私人持有者,限於9月30日前收兌成金圓券,違者沒收。
  - 全國物價凍結在8月19日水平
- 國民黨政府試圖凍結物價,以法令強迫商人以8月19日以前的物價供應貨物,禁止抬價或囤積。而資本家在政府的壓下,雖然不願,亦被迫將部分資產兌成金圓券。在上海,蔣經國將部分不從政令的資本家收押入獄以至槍斃,以作殺一警百。

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## 物價限制崩潰

- 以行政手段強迫凍結物價,造成的結果是市場上有價無市。商人面對虧本的買賣,想盡方法保有貨物,等待機會再圖出售,市場上交易大覆減少,僅有的交易大都轉往黑市進行。物價管制最終失敗,在11月1日全面撤銷。

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## Summary

- To have an impact, a price floor must be set above the equilibrium price and a price ceiling must be set below the equilibrium price
- Effective price floors and ceilings distort markets in that they create a surplus and a shortage, respectively

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## 課堂報告

- 請舉例說明何謂“Substitution Effect”?
- 請舉例說明何謂“**Two goods are complements**”
- 請舉例說明何謂 “Inferior goods”
- 請說明當Demand和supply同時增加時, equilibrium price和quantities 會如何變動
- 假定在其他條件不變下,物品 A的alternative goods價格上升,會造成A的供給曲線如何變動?
- 請說明政府限定物品A價格的上限所造成的影響

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## *Homework:*

- 12: 說明下列事件對香菸需求的影響
  - Ex: 發明新的治癌方法 → Demand increase
- 13: 說明下列物品是 **substitutes, complements, or unrelated**
  - Ex: Private and public transportation → substitutes
- 17. 使用供給和需求的變動, 說明石油價格應如何改變
  - Tax credits were offered for expenditures on home insulation (隔熱填充物) → 石油需求減少 → 價格下降